Broadband Switch: SP4T Switch: Series 91 and 92

Series 91 and 92 Miniature Broadband SP4T Switches

Contact us

Application Notes for RF Switches

MODELS 9140-500 AND 9240-500

These switches provide high-performance characteristics over a multi-octave frequency range. Model 9140-500 covers the 1 to 18 GHz frequency range while the Model 9240-500 covers the 0.2 to 4 GHz range. Their description and operation are the same as that for the Models 9120-500 and 9220-500 SP2T switches.

MODELS 9140T-500, 9140W-500 AND 9240T-500

These switches are Non-reflective versions of the switches described above.

MODELS 9140AH-500 AND 9140AHT-500

These switches are the same as the 9120AH-500 and the 9120AHT-500 except for the number of ports.

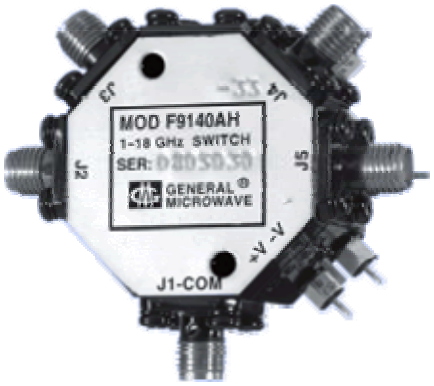
SERIES F91 AND F92

The Series F91 and F92 switches are the same as the corresponding Series 91 and 92 models except the units are equipped with integrated drivers.

SERIES G91 AND G92

These switches are the same as the Series G91 and G92 SP2T switches except for the number of ports.

- **Frequency range (Series 91): 1 to 18 GHz**
- **Frequency range (Series 92): 0.2 to 4 GHz**
- **Rise and fall times as fast as 10 nsec**
- **Reflective and Non-reflective models**
- **Low VSWR and insertion loss**
- **Isolation: up to 60 dB**
- **Miniature size, light weight**



F9140AH-33
(WITH INTEGRATED DRIVER)

9140AH-500
(DRIVERLESS)

MODEL NO.(1)	CHARACTERISTIC	FREQUENCY (GHz)					
		0.2-1	1-2	2-4	4-8	8-12.4	12.4-18
9140-500 F9140	Min. Isolation (dB)	-	60	60	60	60	50
	Max. Insertion Loss (dB)	-	1.4	1.4	1.5	2.0	2.8
	Max. VSWR (ON)	-	1.75	1.75	1.75	1.75	2.0
G9140*	Min. Isolation (dB)	-	60	60	60	60	50
	Max. Insertion Loss (dB)	-	2.0	2.0	2.2	2.7	3.0
	Max. VSWR (ON)	-	1.5	1.5	1.7	1.7	2.0
9240-500*	Min. Isolation (dB)	60	60	60	-	-	-

F9240*	Max. Insertion Loss (dB) Max. VSWR (ON)	1.5 1.6	1.5 1.6	1.5 1.6	- -	- -	- -
G9240*	Min. Isolation (dB) Max. Insertion Loss (dB) Max. VSWR (ON)	60 2.0 1.5	60 2.0 1.5	60 2.0 1.5	- - -	- - -	- - -
9140T-500* **F9140T*** **G9140T***	Min. Isolation (dB) Max. Insertion Loss (dB) Max. VSWR (ON or OFF)	- - -	50 1.5 1.5	50 1.5 1.5	45 1.7 1.7	40 2.0 1.7	40 2.5 2.0
9240T-500* **F9240T*** **G9240T***	Min. Isolation (dB) Max. Insertion Loss (dB) Max. VSWR (ON or OFF)	60 1.3 1.5	60 1.3 1.5	60 1.5 1.5	- - -	- - -	- - -
9140W-500* **F9140W** **G9240W***	Min. Isolation (dB) Max. Insertion Loss (dB) Max. VSWR (ON or OFF)	- - -	60 2.0 1.5	60 2.0 1.7	60 2.2 1.7	60 2.7 2.0	55 3.0 2.0
9140AH-500* **F9140AH**	Min. Isolation (dB) Max. Insertion Loss (dB) Max. VSWR (ON)	- - -	60 1.4 1.75	60 1.4 1.75	60 1.5 1.75	60 2.0 2.0	50 2.8 2.0
9140AHT-500* **F9140AHT**	Min. Isolation (dB) Max. Insertion Loss (dB) Max. VSWR (ON) Max. VSWR (OFF)	- - - -	60 1.6 1.75 1.75	60 1.6 1.75 1.75	60 1.8 1.9 2.0	60 2.5 2.0 2.2	50 3.3 2.0 2.3

*Special-order product. Consult factory before ordering.

PERFORMANCE CHARACTERISTICS

Power Handling Capability
Without Performance Degradation
Units without "T" or "W" suffix: 1W cw or peak
Units with "T" or W suffix
Input to any "OFF" port: 100 mW cw or peak
Input to any "ON" port: 1W cw or peak
Input to common port: 1W cw or peak

Survival Power
Units without "T" or "W" suffix: 1W average
75W peak (1 µsec max. pulse width)
Units with “T” or “W” suffix
Input to any “OFF” port: 1W average,
10W peak (1 µsec max. pulse width)
Input to any “ON” port: 1W average,
75W peak (1 µsec max. pulse width)
Input to common port: 1W average,
75W peak (1 µsec max. pulse width)

(1) Models prefixed with “F” or “G” are equipped with integrated TTL-compatible drivers; models without the “F” or “G” prefix are currentcontrolled units and are furnished without drivers; models suffixed with “T” or “W” are non-reflective except a high VSWR will be present at the common port if all other ports are OFF; models suffixed with “H” are high-speed units.

Switching Characteristics(1)

SERIES 91/F91/G91
Units without “H” suffix
ON time ..... 250 nsec max.
OFF time ..... 250 nsec max.

Control Characteristics

SERIES 91/92/F91/F92
Units With Integrated Drivers
Non-Operating Temperature
Control Input Impedance

Units with “H” suffix

Rise time	10 nsec max.
Fall time	10 nsec max.
ON time	25 nsec max.
OFF time	20 nsec max.
Repetition rate	20 MHz max.

SERIES 92/F92/G92

ON time	500 nsec max.
OFF time	500 nsec max.

Power Supply Requirements

SERIES 91/92/F91/F92

Driverless Units

Bias current required at each port for rated isolation and insertion loss.

PORT OFF

Units without “H” suffix	+50 mA
Units with “H” suffix	+30 mA

PORT ON

Units without “H” suffix	– 50 mA
Units with “H” suffix	– 35 mA

Units With Integrated Drivers

(For one port ON)

	+5V ± 5%	– 12 to –15V
Units Without H” Suffix	190 mA	80 mA
Units With “H” Suffix	95 mA	80 mA
Units With “HT” Suffix	135 mA	80 mA

SERIES G91/G92
(For one port ON)
+5V ±5%, 100 mA
+15V ±5%, 40 mA

(1) For driverless units, shaped current pulses must be provided by user.

Units without “H” suffix	TTL, low power Schottky,one unit load. (A unit load is 0.8 mA sink current and 40 µA source current.)
Units with “H” suffix	TTL, advanced Schottky, one unit load. (A unit load is 0.6 mA sink current and 20 µA source current.)
Control Logic	Logic “0” (– 0.3 to +0.8V) for port ON and logic “1”(+2.0 to +5.0 V) for portOFF.

SERIES G91/G92

Control Input Impedance	Schottky TTL, one unit load. (A unit load is 2.0 mA sink current and 50 µA source current.)
Control Logic	Logic “0” (– 0.3 to +0.8V) for port ON and logic “1” (+2.0 to +5.0 V) for port OFF.

ENVIRONMENTAL RATINGS

Temperature Range

Units with integrated drivers

Operating Range	– 54°C to +110°C
Non-Operating Range	– 65°C to +125°C

Driverless Units

Operating and non-operating Humidity	–65°C to +125°C MIL-STD-202F, Method 103B, Cond. B (96 hrs. at 95%)
Shock	MIL-STD-202F, Method 213B, Cond. B

AVAILABLE OPTIONS

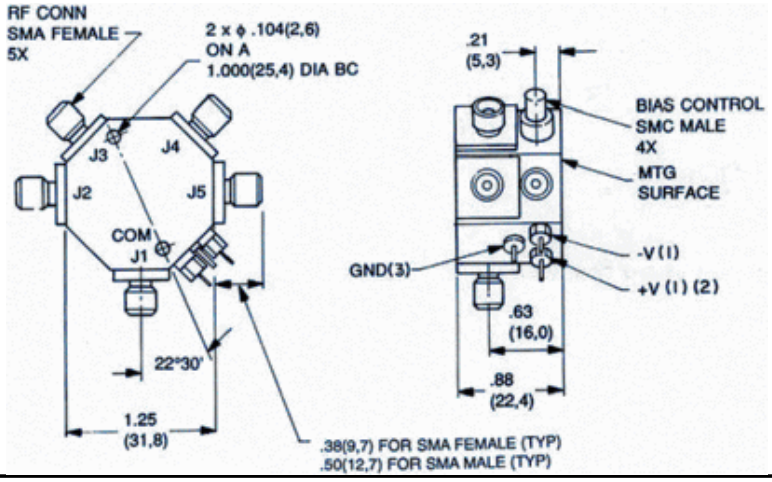
3	SMA female bias/control connectors
7	SMA male RF connectors
9	Inverse control logic; logic “0” for port OFF and logic "1" for port ON (Not applicable to Series 91/92)
33	EMI filter solder-type bias/control terminals
41(1)	Internal video filter, common port only

	(75G, 6 msec)	**42**(1)	Internal video filter, output ports only
Vibration	MIL-STD-202F, Method 204D, Cond. B (.06" double amplitude or 15G, whichever is less)	**43**(1)	Internal video filter, all ports
		55(2)	Frequency range 0.5 to 18 GHz.
		64A	SMB male bias/control connector
Altitude	MIL-STD-202F, Method 105C, Cond. B (50,000 ft.)		
Temp. Cycling	MIL-STD-202F, Method 107D Cond. A, 5 cycles		

(1) Not applicable to Series 92//F92/G92. See impact of Video Filter Options on specifications at Switches Applications Notes.

(2) Applicable only to 1 to 18 GHz switches. See impact of Option 55 on specifications

DIMENSIONS AND WEIGHT



Weight 2 oz. (57 grams) approx.

Dimensional Tolerances, unless otherwise indicated: .XX ±.02; .XXX ±.005

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